Fish monitoring in River Philip (Nova Scotia) during spring 2011 with a focus on the Atlantic salmon (*Salmo salar*) smolt migration

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Abstract

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Most rivers in eastern Canada have small salmon stocks consisting of a few hundreds to a few thousand spawning fish with the larger rivers being exceptions (e.g. Margaree, Miramichi and Restigouche rivers). River Philip in Gulf Nova Scotia is one of these smaller systems with a healthy Atlantic salmon population consisting of less than two thousand spawning fish. The objective of the project is to compare the population abundance and the biological characteristics of smolts in River Philip to larger systems. The ultimate goal of the project is to link the smolt abundance to juvenile densities and spawning adult returns. This report presents results of the fish monitoring project conducted in River Philip, Nova Scotia, during spring 2011. A mark-recapture experiment was conducted to estimate the size of the smolt run. A total of 14 species were captured using a rotary screw trap of which 95% of the total catch consisted of the rainbow smelt. The estimated posterior probability for the smolt run size was 24,300 with a 95% confidence that at least 13,000 smolts migrated. Based on a juvenile rearing habitat area of 0.96 million m^2, the smolt estimate corresponds to 2.5 smolts per 100 m^2. Data suggest that freshwater production on River Philip is good and the smolt abundance per unit of rearing habitat was proportionally similar to the larger rivers.

Résumé

Breau, C., Ripley, D.W. 2012. Fish monitoring in River Philip (Nova Scotia) during spring 2011 with a focus on the Atlantic salmon (*Salmo salar*) smolt migration. Rapp. tech. can. sci. halieut. aquat. 2974. v + 25 p.

La plupart des rivières de l'est du Canada contiennent de petits stocks de saumon de quelques centaines ou de quelques milliers de poissons frayant, les plus grandes rivières faisant exception (p. ex. les rivières Margaree, Miramichi et Restigouche). La rivière Philip dans le Golfe de la Nouvelle-Écosse est l'un de ces petits cours d'eau avec une population saine de saumons de l'Atlantique de moins de deux mille poissons frayants. L'objectif de ce projet est de comparer l'abondance de la population et les caractéristiques biologiques des saumoneaux de la rivière Philip à ceux de plus grands cours d'eau. Le but ultime du projet est de lier l'abondance des saumoneaux à la densité des poissons juvéniles et aux remontes d'adultes reproducteurs. Le présent rapport présente les résultats du projet de surveillance des poissons mené à la rivière Philip, en Nouvelle-Écosse, au printemps 2011. Une expérience de marquage et de recapture a été effectuée afin d'estimer l'importance des remontes de saumoneaux. Au total, 14 espèces ont été capturées à l'aide d'un piège rotatif dont 95 % des prises totales étaient des éperlans arc-en-ciel. La probabilité postérieure estimée de l'importance des remontes des saumoneaux était de 24 300, avec une probabilité de 95 % qu'au moins 13 000 saumoneaux aient migré. D'après la zone des habitats de croissance des poissons juvéniles de 0,96 million de mètres carrés, l'estimation des saumoneaux est de 2,5 saumoneaux par 100 m^2. Les données suggèrent que la production en eau douce dans la rivière Philip est bonne, et l'abondance des saumoneaux par unité d'habitat de croissance était proportionnellement semblable à celle de plus grandes rivières.

Introduction

In 1984, restrictive fisheries management measures were put in place to increase the spawning escapement of multi-sea-winter Atlantic salmon (*Salmo salar*) in rivers of eastern Canada (DFO 1984). As part of the management plan, the hook and release of large Atlantic salmon became mandatory in the recreational fisheries of the Maritime provinces and the commercial fisheries closed in the same area. Following these interventions, juvenile densities increased in most monitored rivers of the southern Gulf of St. Lawrence (Moore and Chaput 2007; Breau et al. 2009). However, returns of adult Atlantic salmon did not increase accordingly. In 2001, a smolt monitoring program began in the Margaree River to estimate the size of the smolt population migrating from the river. The objective of this program was to determine whether freshwater production or marine survival was limiting the abundance of returning adults (Clément et al. 2007; Breau et al. 2010). Results suggest that poor marine survival rather than freshwater production was limiting the adult salmon returns. Findings from the Miramichi and Restigouche rivers indicate similar trends of poor marine survival resulting in no increase of adult salmon returns (Cameron et al. 2009; Chaput et al. 2010).

To date, programs monitoring the smolt migration in the southern Gulf of St. Lawrence have been conducted in large river systems such as the Margaree, Miramichi and Restigouche rivers. In Gulf Nova Scotia, the Margaree River is the largest river with a drainage area of 1,100 km^2. The rivers on mainland Gulf Nova Scotia are comparatively smaller with most drainage areas being less than 300 km^2. The largest river systems on mainland Gulf Nova Scotia are the River Philip (726 km^2), Wallace River (536 km^2), East River (Pictou; 458 km^2) and West River (Antigonish; 353 km^2) (O'Neil et al. 1997).

Each river with the presence of Atlantic salmon is considered to have an individual spawning stock (Chaput 2004). Most rivers in eastern Canada have small salmon stocks consisting of a few hundreds to a few thousand spawning fish with the larger rivers being exceptions (Chaput 1998). Small population sizes are more vulnerable to environmental and fishing pressures. The small rivers can be characterized by more severe low water level conditions, more frequent ice breakup events and a greater relative angling effort, all of which may negatively impact the stocks.

In 2008, the Cumberland County River Enhancement Association, the Nova Scotia Salmon Association and the Atlantic Salmon Federation expressed an interest in determining the population size of Atlantic salmon smolts migrating from the River Philip. The main goal was to quantify smolt abundance in a smaller Atlantic salmon population on mainland Nova Scotia and to characterize the fish species abundance and diversity. The smolt abundance and biological characteristics could then be compared to the salmon populations of larger neighbouring salmon producing rivers. This report provides an overview of the findings for the first year (2011) of the study.

Materials and Methods

Study area

River Philip (Cumberland County; 45° 59'N, 65° 40'W) is the largest basin of the rivers on mainland Nova Scotia flowing into the Northumberland Strait and the basin has a drainage area of 726 km^2 (Fig. 1). Two native salmonids, the Atlantic salmon and brook trout (*Salvelinus fontinalis*), spawn in River Philip. A spawning population of brown trout (*Salmo trutta*), a non-native salmonid, is also present.

Field operations

A rotary screw trap (RST; 1.83 m diameter drum, Pisces Research Corp. Vancouver, Canada) was installed in the River Philip. This rotary screw trap is of the same dimension as previously used in the Margaree River (Chaput and Jones 2004). With the exception of the wings, the RST setup was similar to that used in the Margaree River (Breau et al. 2010).

The RST was installed on April 27th and 28th, but only began operating on May 2nd because of high water levels (Table 1). The RST was not operating for 5 additional days (May 8, May 10-11, and May 17-18) because of high water conditions. On June 2nd, the study was terminated because the water velocity was lower than the required speed of 3 rpm.

Water temperature was recorded every hour using a VEMCO Minilog© installed at the RST. Water level was recorded daily from a water level gauge located approximately 50 m downstream of the RST. Air and water temperature, percent cloud cover and other comments were recorded daily prior to fish sampling. Once fish sampling completed, the RST was cleaned (when required) and was set for fishing. The speed of rotation of the RST was recorded by counting the number of revolutions of the drum per minute (RPM) during one minute.

Each morning, a crew composed of two to three persons tended the RST and processed the fish held in the live box. All fish captured were identified and counted. On most days, rainbow smelt were too numerous for an individual count and estimates were made instead. A subsample (one dipnet) of smelts was placed in a bucket and counted. This procedure was repeated three to five times daily. After, an equivalent number of dipnets of smelts were placed in buckets and the number of smelts was estimated. When the numbers of smelts were lower towards the end of the daily operations, smelts were counted.

On a daily basis, fork length measurements and sex (by external characteristics and ventral pressure) were obtained from 30 smelts. Fork length measurements were recorded for all other fish. All mortalities were identified to species, counted and measured. Other than for tagged smolts, all fish were released at the RST.

Sampling and tagging procedures for the smolts

The fork length was measured from a maximum of 50 salmon smolts per day. Smolts were individually tagged using numbered clear polyethylene streamer tags (size 13P, Hallprint©) inserted at the base of the anterior dorsal fin. Groups of 20 tagged fish were placed in plastic pails (20L) with lids and placed in the river until the RST sampling was completed. The lids and the upper portion of the pails had holes for water circulation. The tagged smolts were then transported 5.6 km upstream and released in the river at the bridge on Jungle Road (Fig. 1; a drive that took approximately 10 minutes). Tagged smolts were checked at the release site for tag loss, mortalities or weak fish.

At the RST, prior to tagging, all smolts were examined for the presence of tags or tagging scars. Smolts that were not tagged were counted and released at the RST. The tag number of recaptured smolts was recorded and the fish was released at the RST.

Estimation of the smolt run size

The mark and recapture experiment described above was conducted to estimate the smolt run size and the catchability efficiency of the RST. The directed acyclic graph of the model for estimating the size of the smolt run is presented in Figure 2. The parameter of interest is the number of smolts (N) migrating from the river in 2011. N is estimated based on the number of smolts caught (C), the number marked (M) and the number recaptured (R). An uninformative prior on N varying between 0 and 250,000 using a uniform distribution was chosen.

The posterior probabilities for the smolt run size and catchability were estimated in a Bayesian framework. The Bayesian model was run in "WinBUGS" with a Monte Carlo Markov Chain Gibbs sampling procedure (Spiegelhalter et al. 2010). The WinBUGS codes are provided in Appendix 1. Three chains of initial values were used to assess convergence. The first 150,000 Monte Carlo Markov Chain (MCMC) draws were discarded (also known as burn-in) and another 150,000 MCMC samples were drawn. From these last samples, the posterior distributions were based on every 10^{th} MCMC sample to reduce potential autocorrelation. The key assumption of the model was that the probability of capture of tagged and untagged fish is independent and identically distributed.

Results

Smolts

Once the RST was set on May 2, it operated every day except for five days in May because of high water levels (Table 1). The RST was jammed (not turning) on two occasions, once on May 8 and again on May 10. Results for these 2 days are likely from partial counts. The speed of rotation varied from 3 to 8 RPM during the study, and was generally a function of water levels. Mean water temperature exceeded 10°C from May 4 to May 8, prior to the highest catch (Fig. 3). From May 9 to 18, water temperature decreased, and thereafter remained above 10°C. Water levels did not correlate with the peak catch.

A total of 24,422 fish, consisting of 14 species, were caught in the RST, of which 23,196 (95%) were rainbow smelts (Table 2). Atlantic salmon was the second most frequently caught species with 523 smolts and 212 juveniles captured. There were 500 mortalities of all fish species combined during the study. Smelt mortalities composed 90% of those mortalities.

The first salmon smolts were captured the first day that the RST was set and the peak catch occurred on May 7th, with 106 smolts captured (Table 3; Fig. 3A). Half the total smolt catch for the season had occurred by May 13th. The modal fork length of smolts was 11.5 cm (Fig. 4A) and the average daily fork length varied between 12 cm and 14 cm (Fig. 4B). There was no seasonal trend in the average fork length. The juvenile salmon ranged in size from 5.5 to 10.1 cm and had a modal fork length of 7.5 cm (Fig. 4).

A total of 396 smolts were marked and released upriver; 8 of these were recaptured at the RST (Table 3). Six of 8 smolts were recaptured within 3 days of release; the longest time to recapture was 8 days (Fig. 5). Based on this small number of recaptures, the RST efficiency over the season was estimated at 2.2% with a 95% Bayesian Credibility Interval (BCI) range of 1.0% to 4.0% (Fig. 6A). The median of the posterior probability of the smolt run was 24,300 (95% B.C.I. of 13,000 to 53,590; Fig. 6B). This is considered to be a minimum estimate as smolts captures have been missed during the periods of high water when the RST was not in operation.

Other salmonids

Brook trout and brown trout were caught throughout the study with no distinctive peak periods (Fig. 7A). Brook trout measured between 6.2 and 18.2 cm whereas brown trout measured between 6.2 and 17.1 cm (Fig. 7B).

Other fishes

In addition to the salmonids, 11 other fish species were captured in the RST (Table 2). The daily catches consisted mostly of rainbow smelt with the largest catches made between May 2nd and May 16th (Fig. 8A). The mean sex ratio of smelt was 65% female and decreased below 40% after May 26th (Fig. 8B). Rainbow smelt were of similar size to salmon smolts with a modal fork length of 14.0 cm (Fig. 9A) and mean daily fork lengths varying between 14.1 and 15.5 cm (Fig. 9B). The daily average size of smelt decreased over the season with smelts being of smaller size, as the season progressed.

Lake chub and creek chub were captured in the RST beginning in mid-May (Fig. 10A). Besides the threespine stickleback, less than 100 individuals of any species were captured (Table 2; Figs. 10 to 12). Most of these were small fish, measuring less than 12 cm, except for eels which measured 15 to 30 cm, lamprey ammocoetes that measured between 9 and 16 cm and white suckers which measured 6.2 to 28.1 cm.

Discussion

The objective of the project on River Philip was to monitor and compare the smolt abundance, the timing of the migration and the biological characteristics of smolts in a population with a small number of spawning adults. The conservation requirement for spawning adults on River Philip is 358 large salmon and 75 small salmon (O'Neil et al. 1996). The ultimate goal of the project is to link the smolt abundance to juvenile densities and spawning adult returns. This report provides an overview of the findings for the first year of the study for fish diversity, smolt abundance and smolt migration pattern on River Philip.

Smolt monitoring programs are generally carried out to determine whether freshwater production or marine survival is limiting the abundance of adult Atlantic salmon returns to rivers. In the Margaree River, the results indicate that smolts migrated from rivers in large numbers and that low survival at sea was the cause for the lower than expected adult returns (Breau et al. 2010). Cairns (2001) listed 62 hypotheses to explain declines in the estimated abundance of Atlantic salmon in the pre-fishery time period. Many of these hypotheses are still valid today as explanations for the absence of increase in adult returns. One emerging hypothesis, however, is the decreased ecosystem productivity in the North Atlantic Ocean (Beaugrand 2009) that would lead to increased Atlantic salmon mortality at sea. Indeed, decadal changes in phytoplankton and zooplankton abundances and Atlantic salmon catches have been related to the northern hemisphere temperature, sea surface temperature and the North Atlantic Oscillation Index (Beaugrand and Reid 2003).

The population estimate of the smolt run in River Philip during spring 2011 was 24,300 fish with 95% confidence that at least 13,000 smolt migrated from the river. Based on a juvenile rearing habitat area of 0.96 million m^2, the smolt estimate corresponds to 2.5

smolts per 100 m^2. The smolt production for the Margaree River varied between 3.3 and 4.6 smolts per 100 m^2 of habitat during 2004 to 2009 (Breau et al. 2010) whereas smolt estimates for the Miramichi, Restigouche and Kedwick rivers varied between 1.3 to 3.8 smolts per 100 m^2 of habitat during 1998 to 2008 (Cameron et al. 2009; Chaput et al., 2010). Hence, smolt estimates for River Philip are within the range of estimates for rivers in the Gulf Region.

It is believed that mortality at sea is lower for larger/older smolts because of lower predation rate on these fish. The modal length of smolts in River Philip was 11.5 cm and was comparable to that of the larger river systems such as the Margaree and Miramichi rivers (Chaput et al. 2002; Breau et al. 2010). In the larger rivers, the daily average smolt size increased during the season with larger smolts migrating towards the end of the season. This was not the case in River Philip. The daily average lengths remained the same over the season. However, the RPM of the RST was low towards the end of the season and some smolts could have escaped from the RST during these last few sampling days.

In 2009, the Nova Scotia Department of Fisheries and Aquaculture released 25,000 young-of-the-year Atlantic salmon in River Philip as unclipped alevin. Therefore, the smolts sampled in this study could have included some from the hatchery stocking program. No stocking occurred in 2010.

During the spring, the smelts migrate upstream into the river to spawn while the Atlantic salmon smolts migrate from the river to the ocean. Rainbow smelts were the most abundant migratory fish during the first half of May, and the migration coincided with the first half or more of the smolt migration. Being of relatively similar size to smolts, smelts may provide a predation buffer in the lower portion of the river, at least for the first half of the smolt migration. Smelts are also an important food source for kelts, the adult Atlantic salmon that spawned the previous fall, as these fish migrate to the ocean to feed.

Spring 2011 was the first year for the project on River Philip and modifications will be made in spring 2012 to increase the fishing efficiency of the RST and reduce the uncertainty in the estimates. The RST will be relocated to a site having higher water velocity. Wing structures will be added to the RST to increase the capture efficiency of smolts. Scale samples will be collected for age determination of smolts.

In conclusion, River Philip is representative of most rivers in eastern Canada because of its small basin size and small spawning stock. The spawning population of Atlantic salmon on these rivers consists of a few hundred to a few thousand spawners. In addition to having fewer spawners, the fish in these rivers are exposed to more variable environmental conditions, a higher fishing pressure and possibly greater at-sea mortality (in absolute number); all of which could have a greater impact on these fish compared to populations from larger rivers. The first year of monitoring shows that the smolt abundance per unit of rearing habitat in River Philip during spring 2011 was proportionally similar to the larger rivers. The run-timing and the biological

characteristics of the smolts were comparable to those from the larger rivers. In total, 14 fish species were captured; a number comparable to the larger rivers.

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Table 1. Details of the RST operation in River Philip during spring 2011.

Month	Day	Water temperature (°C)		Water level (cm)	RPM	RST fishing	RSt status
		Mean	Maximum				
April	28	10.4	11.4			No	High water
	29	11.8	12.7			No	High water
	30	11.4	12.3			No	High water
May	1	8.1	10.2			No	High water
	2	7.6	9.4			Yes	Wheel set
	3	8.8	9.9	34	4.5	Yes	
	4	10.6	13.1	32	5	Yes	
	5	11.5	12.2	29	5.25	Yes	
	6	11.0	12.4	39	6.75	Yes	
	7	10.2	11.3	23	5.5	Yes	
	8	10.5	11.5	52	7.5	No	Wheel jammed
	9	9.2	10.9	42	5.25	Yes	
	10	7.8	8.0	120		No	Wheel jammed
	11	7.7	8.0			No	Not fishing
	12	7.4	7.9			Yes	Wheel set
	13	7.8	8.8		8	Yes	
	14	8.4	9.1		8	Yes	
	15	8.7	9.0		7.5	Yes	
	16	7.8	8.5		7	Yes	
	17	8.4	9.2			No	Not fishing
	18	9.2	10.5			No	Not fishing
	19	11.4	14.2		8	Yes	
	20	13.5	15.0	49	8	Yes	
	21	12.0	14.2	44	8	Yes	
	22	9.6	11.2	36	6.5	Yes	
	23	9.6	11.4	41	6	Yes	
	24	10.2	11.7	39	5.25	Yes	
	25	11.9	12.9	24	5.5	Yes	
	26	11.5	13.4	23	5	Yes	
	27	14.3	17.4	17	4	Yes	
	28	13.9	16.2	13	4.5	Yes	
	29	14.9	18.1	28	4	Yes	
	30	17.2	19.3	33	4.25	Yes	
	31	15.9	17.6	28	3	Yes	Turning slowly
June	1	14.2	16.0	6	3.5	Yes	Turning slowly
	2	15.5	17.3				Wheel removed

Table 2. The total number of fish captured by species in the rotary screw trap in River Philip during spring 2011.

Species	Life stage	Total	Released alive	Mortality
Lamprey	Ammocoete	11	10	1
Atlantic salmon	smolt	523	521	2
	parr	212	211	1
Brook trout		31	31	0
Brown trout		106	106	0
Rainbow smelt		23,196	22,746	450
Blacknose dace		17	14	3
Lake chub		67	65	2
Creek chub		4	4	0
Golden shiner		32	30	2
Common shiner		17	16	1
White sucker		47	46	1
American eel		3	3	0
Threespine stickleback		120	94	26
Blackspotted stickleback		27	17	10
Stickleback (not specified)		1	0	1
Grand Total		24,422	23,922	500

Table 3. The daily catch and fate of the Atlantic salmon smolts at the rotary screw trap in River Philip during spring 2011. Total catch refers to the first time catch (excludes the recaptures).

Month	Day	Total	Released		Mortalities			Recaptures	
		catch	Untagged	Tagged	Sacrificed	Holding box	After tagging	Live	Mortalities
April	28								
	29								
	30								
May	1								
	2								
	3	13	1	10	2	0	0		
	4	2	0	2	0	0	0	0	0
	5	8	0	8	0	0	0	0	0
	6	2	0	2	0	0	0	0	0
	7	106	70	36	0	0	0	0	0
	8	59	0	59	0	0	0	0	0
	9	24	2	22	0	0	0	2	0
	10	10	0	10	0	0	0	0	0
	11								
	12								
	13	31	1	29	0	1	0	0	0
	14	23	0	23	0	0	0	0	0
	15	4	4	0	0	0	0	0	0
	16	12	0	12	0	0	0	0	0
	17								
	18								
	19	16	0	16	0	0	0	1	0
	20	41		0	0	0	0	0	0
	21	17	1	16	0	0	0	0	0
	22	17	0	17	0	0	0	0	0
	23	19	0	18	0	1	0	1	0
	24	16	0	16	0	0	0	0	0
	25	10	0	10	0	0	0	0	0
	26	44	1	43	0	0	0	0	0
	27	22	0	22	0	0	0	2	0
	28	8	0	8	0	0	0	0	0
	29	7	0	7	0	0	0	1	0
	30	9	2	7	0	0	0	1	0
	31	1	0	1	0	0	0	0	0
June	1	2	0	2	0	0	0	0	0
	2								
	Total	523	82	396	2	2	0	8	0

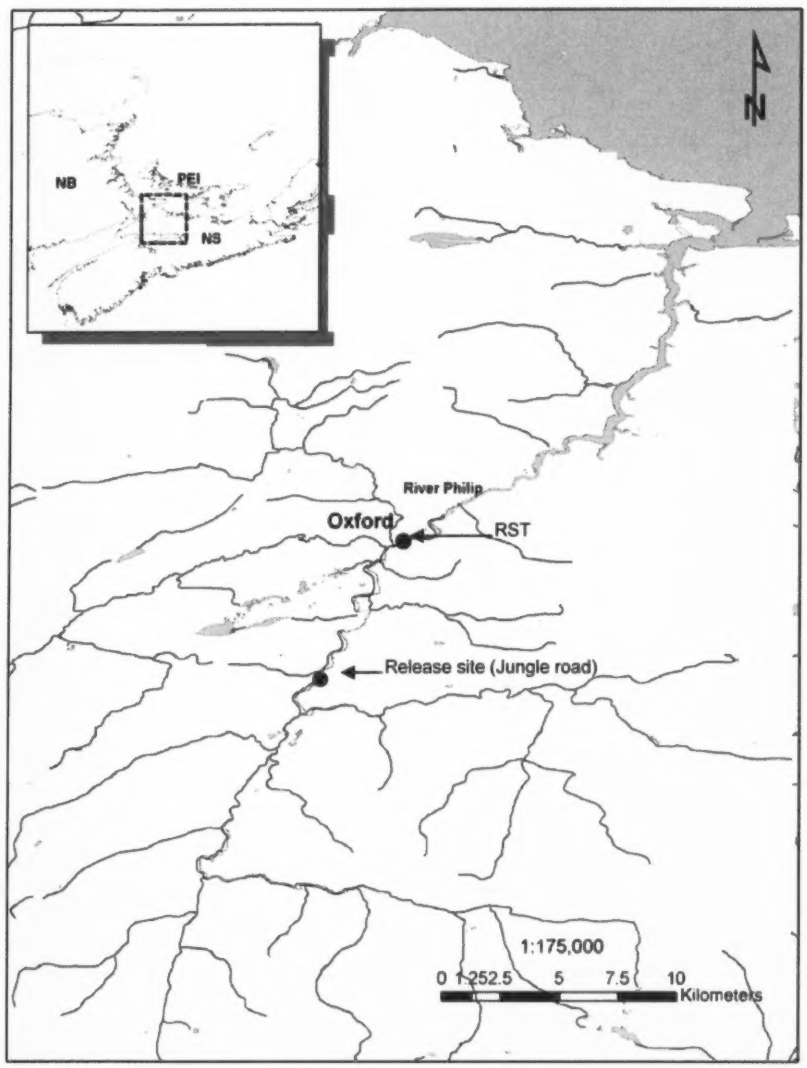

Figure 1. Location of the rotary screw trap (RST) and the release site of marked smolts in the River Philip, Nova Scotia, during spring 2011.

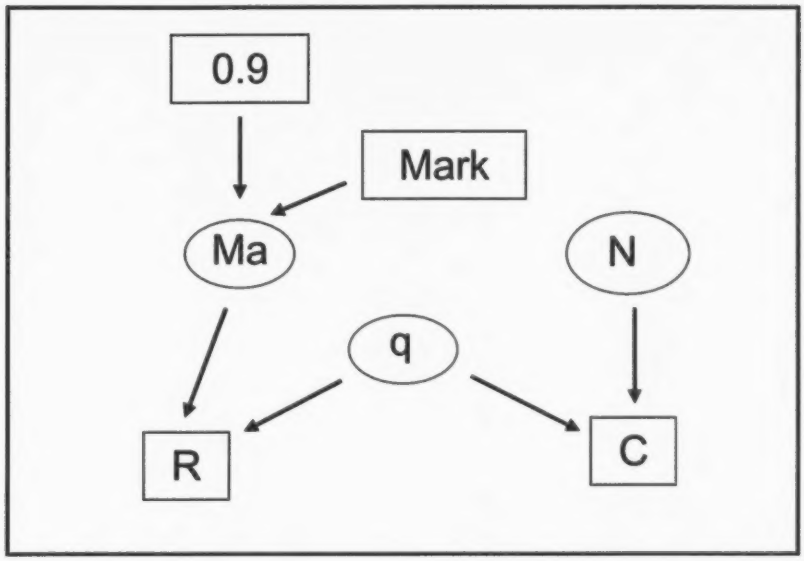

Figure 2. Directed Acyclic Graph of the processes linking the observations and the parameters. The parameters of interest are in ellipses and the data are in rectangles. The estimate of smolt abundance (N) is based on the total number of smolt captured (C), the catchability of the smolt (q) and the smolts recaptured (R).

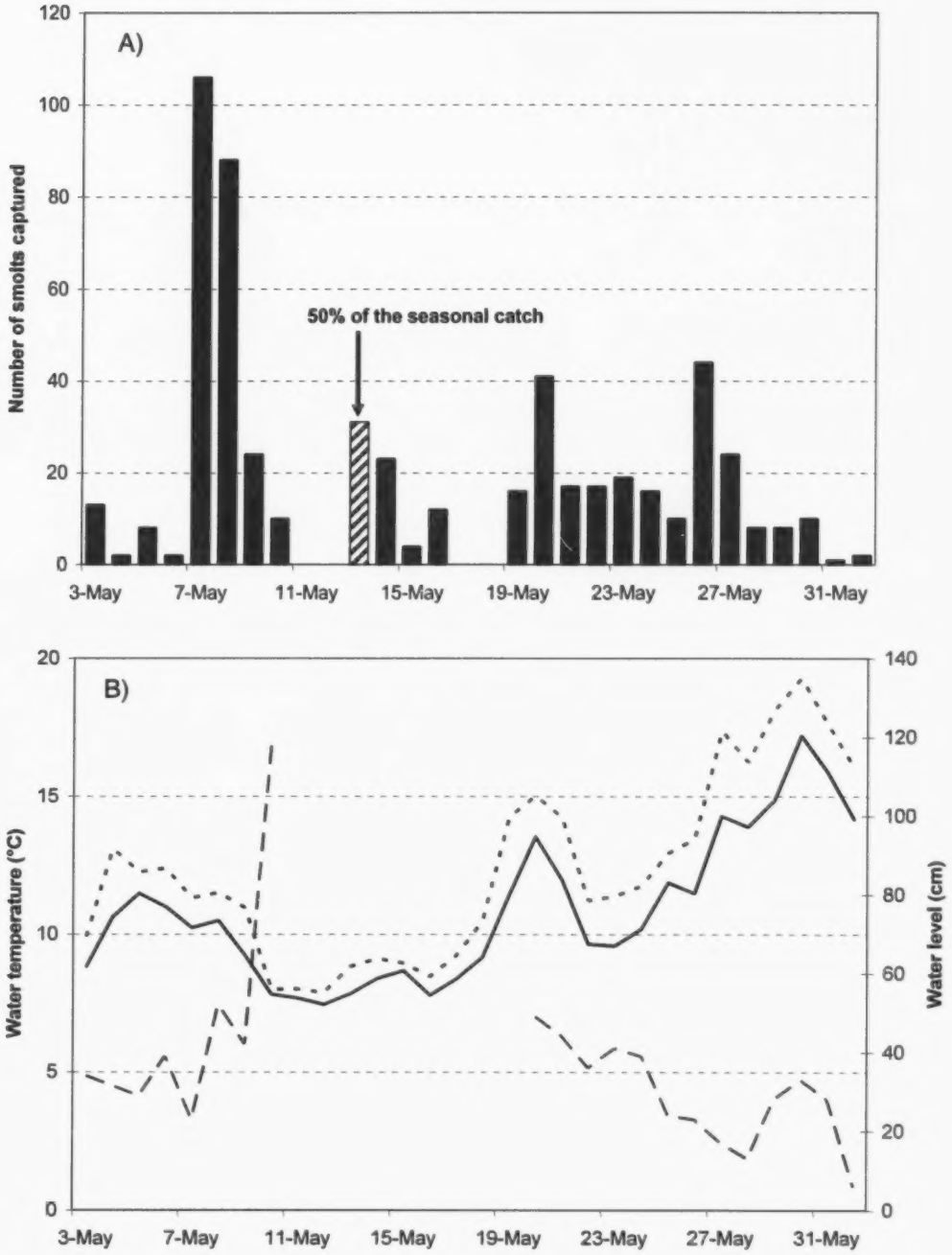

Figure 3. A) The daily catch of wild smolts and B) the mean (solid line) and maximum daily (dotted line) water temperature and the water level (dased line) in the River Philip during spring 2011. The dashed bar represents the day when 50% of the smolts were caught.

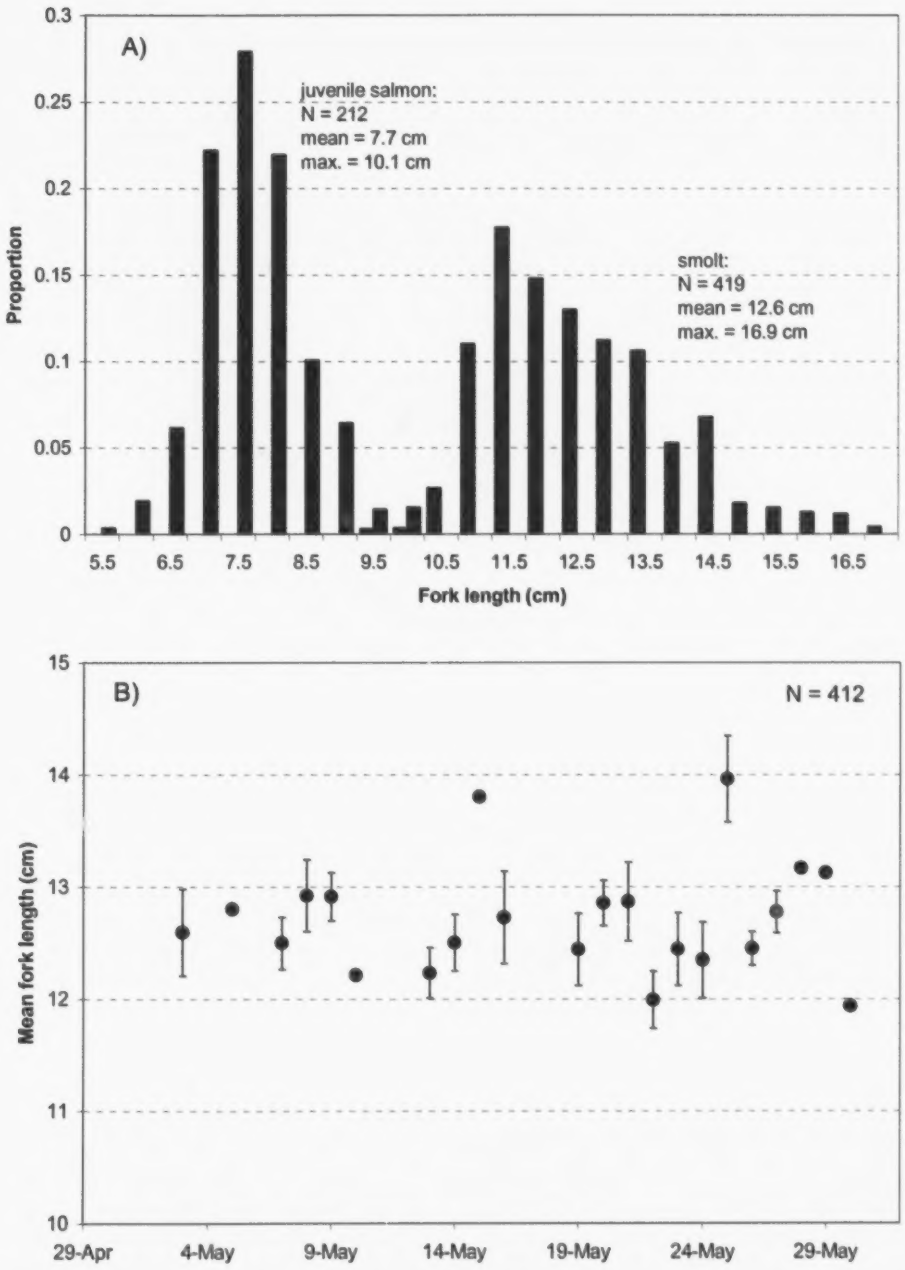

Figure 4. A) Fork length distribution (cm) of Atlantic salmon juveniles (black bars) and smolts (grey bars) and B) mean daily fork length (± one standard error) of Atlantic salmon smolts captured at the rotary screw trap in the River Philip during spring 2011. In panel B, the mean are shown for n > 3 and standard error of the mean included when n > 10.

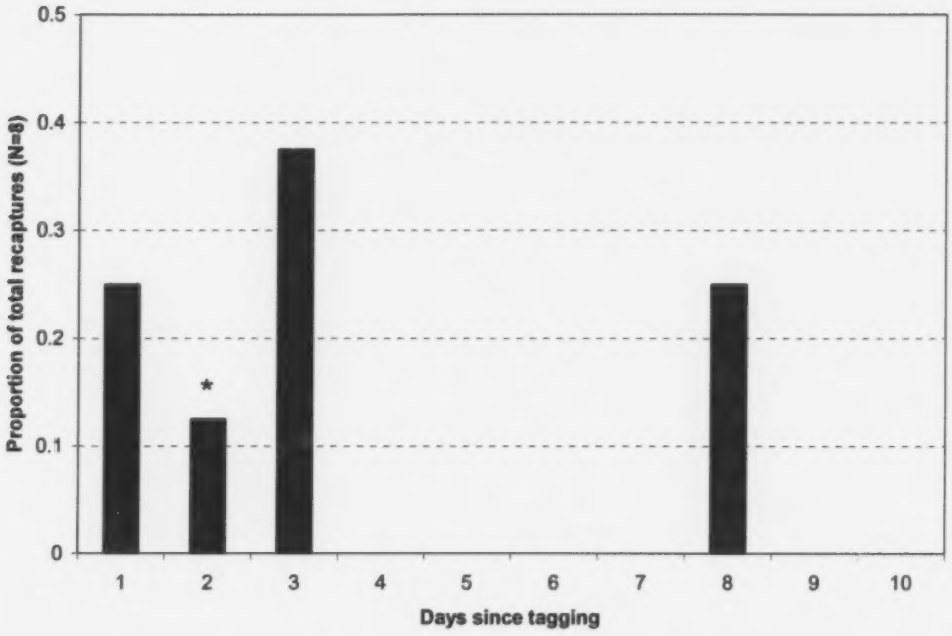

Figure 5. The timing of the movement of marked smolts from the release site to the RST in the River Philip during spring 2011. * denotes a sample size of 1 fish.

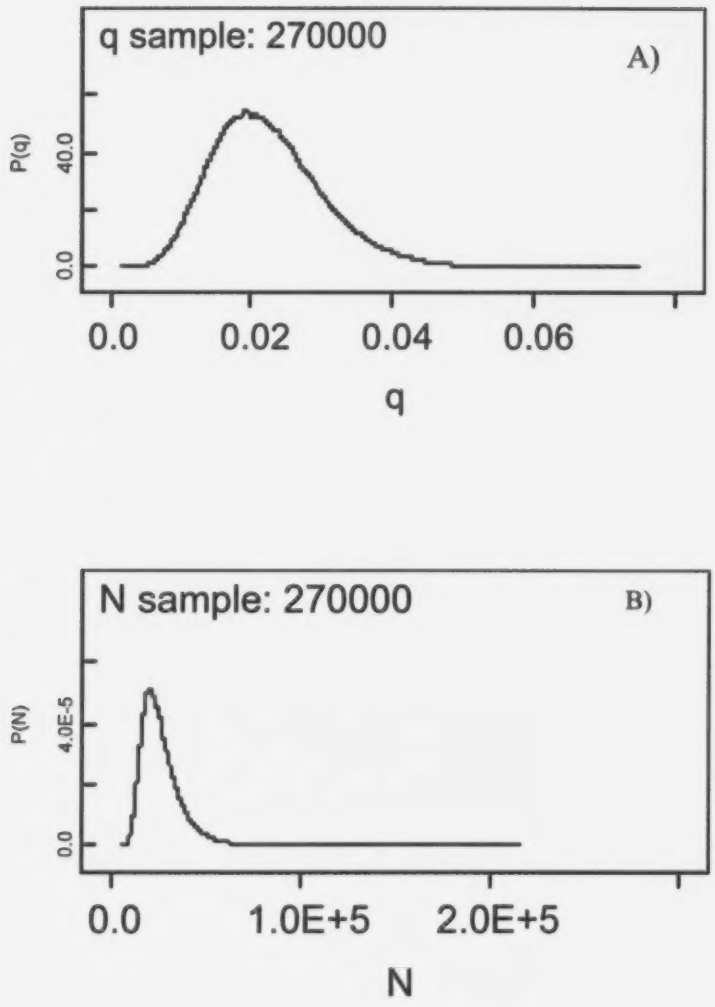

Figure 6. The posterior probability profiles from the MCMC sampling for A) the catchability and B) the run size of wild Atlantic salmon smolts from the River Philip during 2011.

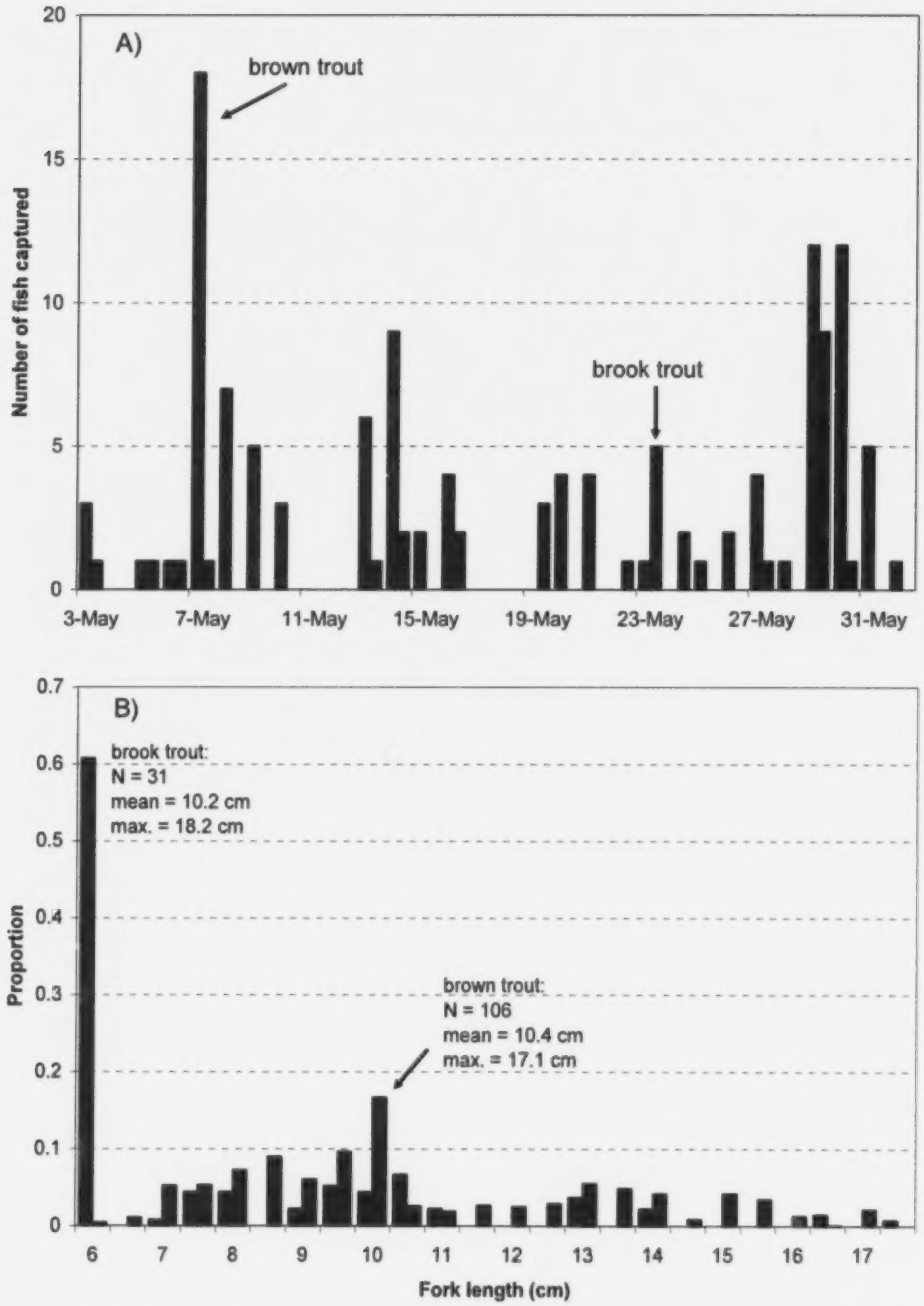

Figure 7. A) The daily catches and B) the fork length distribution of brook trout (black bars) and brown trout (grey bars) in the rotary screw trap in the River Philip during spring 2011.

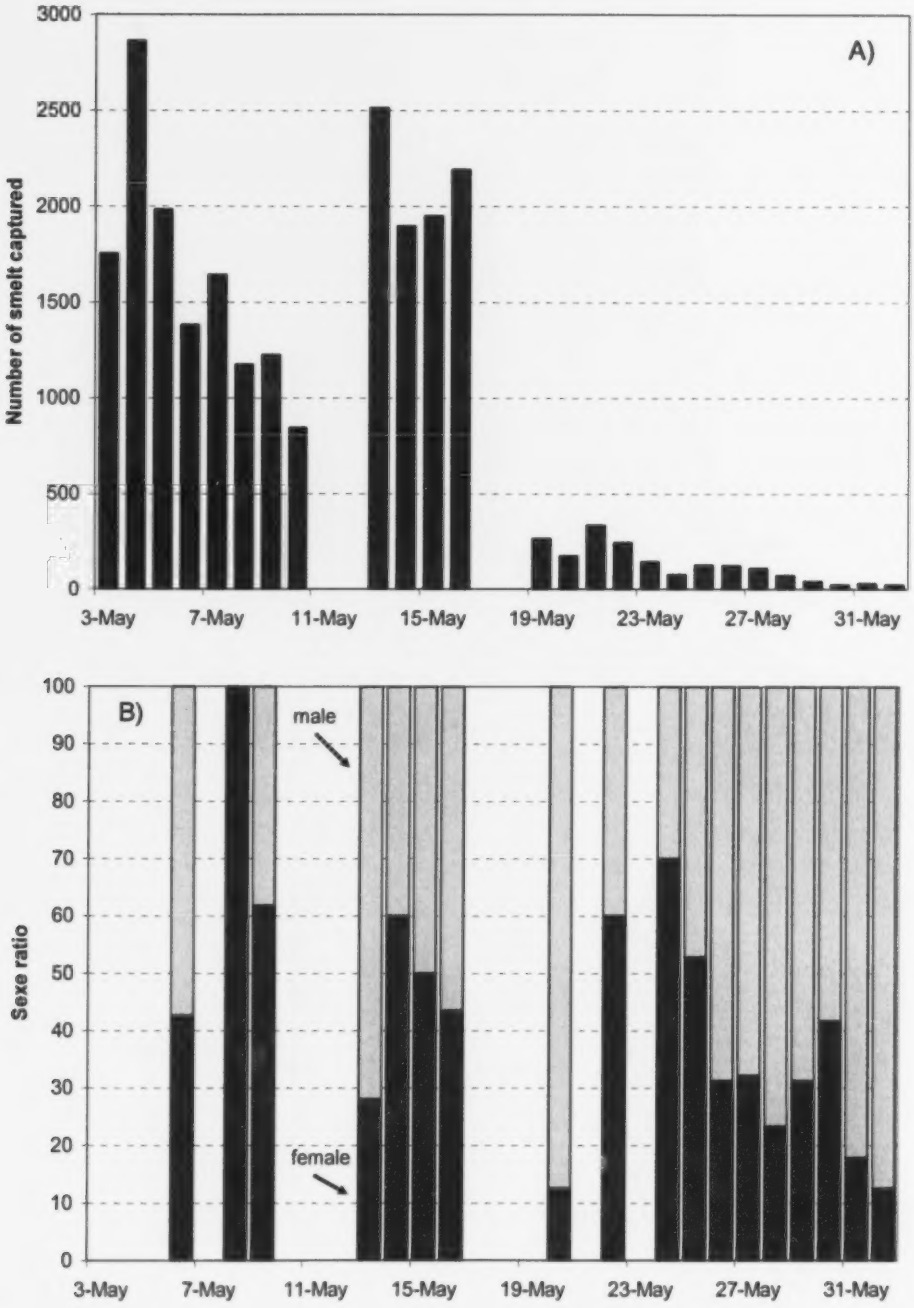

Figure 8. A) The daily catches and B) the sex ratio (female: dark grey bars and male: light grey bars) of rainbow smelt caught in the rotary screw trap in the River Philip during spring 2011.

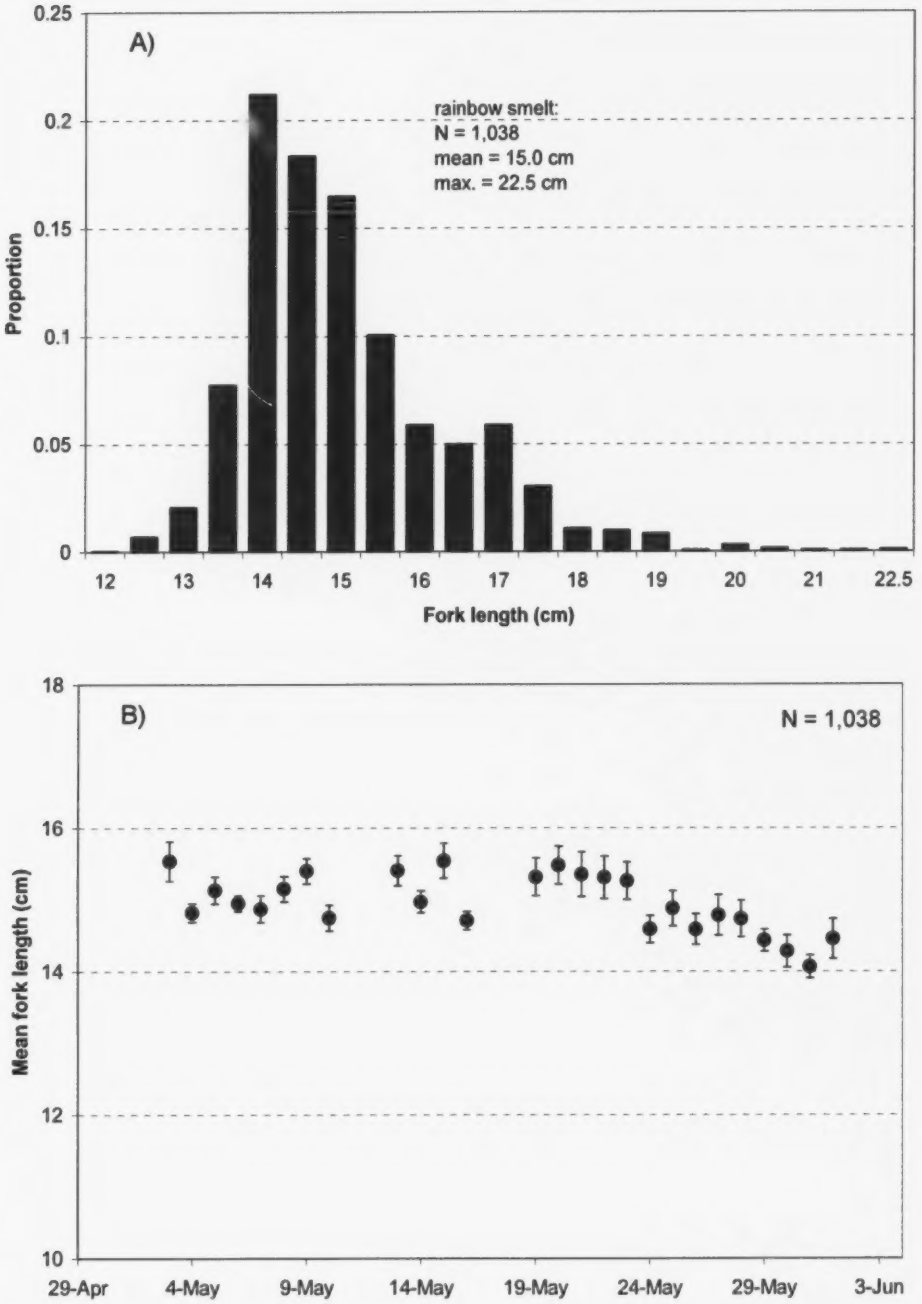

Figure 9. A) The fork length distribution and B) the daily mean (± 1 S.E.) fork length of rainbow smelt caught in the rotary screw trap in the River Philip during spring 2011.

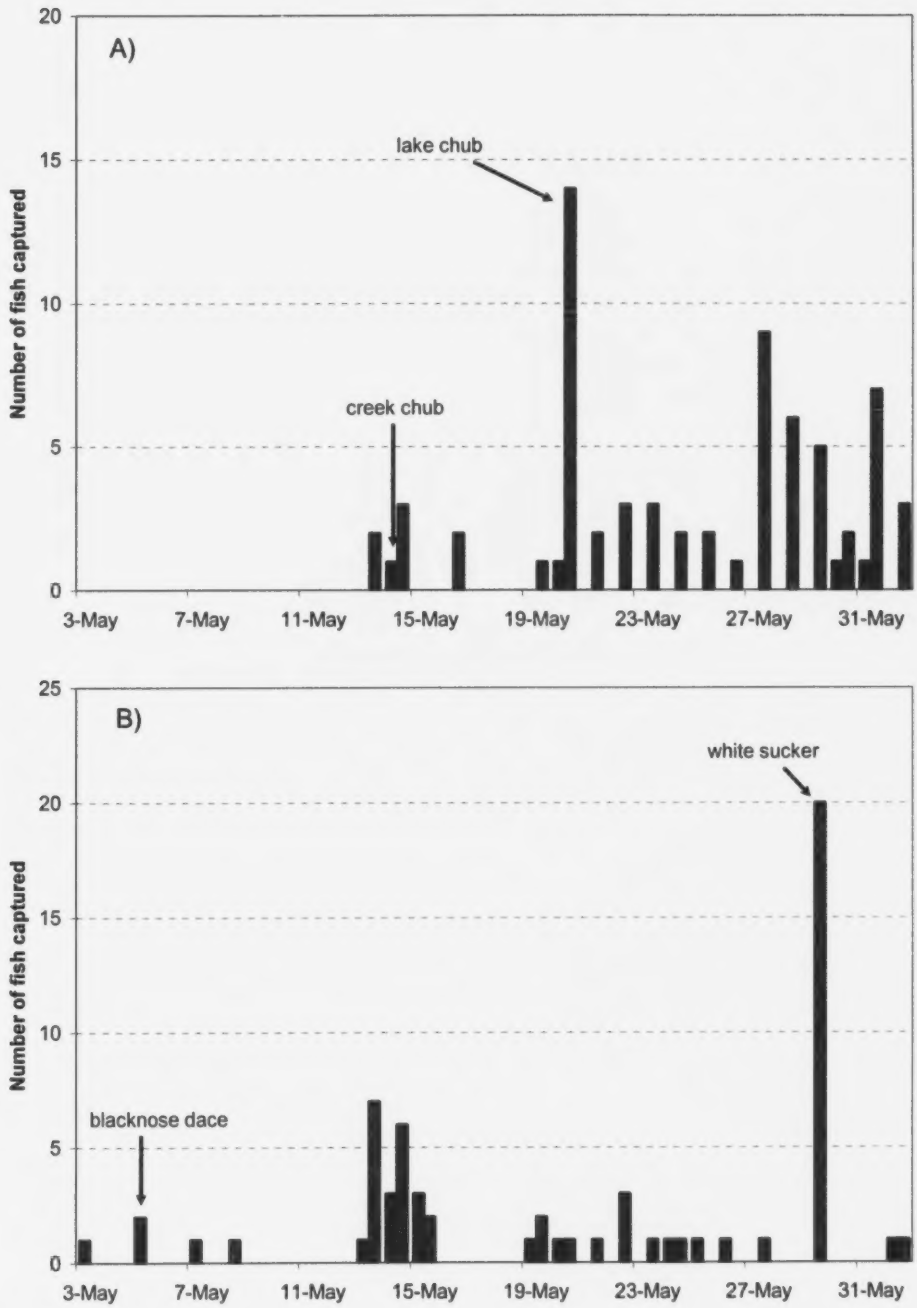

Figure 10. The daily catches of A) lake chub (grey bars) and creek chub (black bars) and B) white sucker (grey bars) and blacknose dace (black bars) in the rotary screw trap in the River Philip during spring 2011.

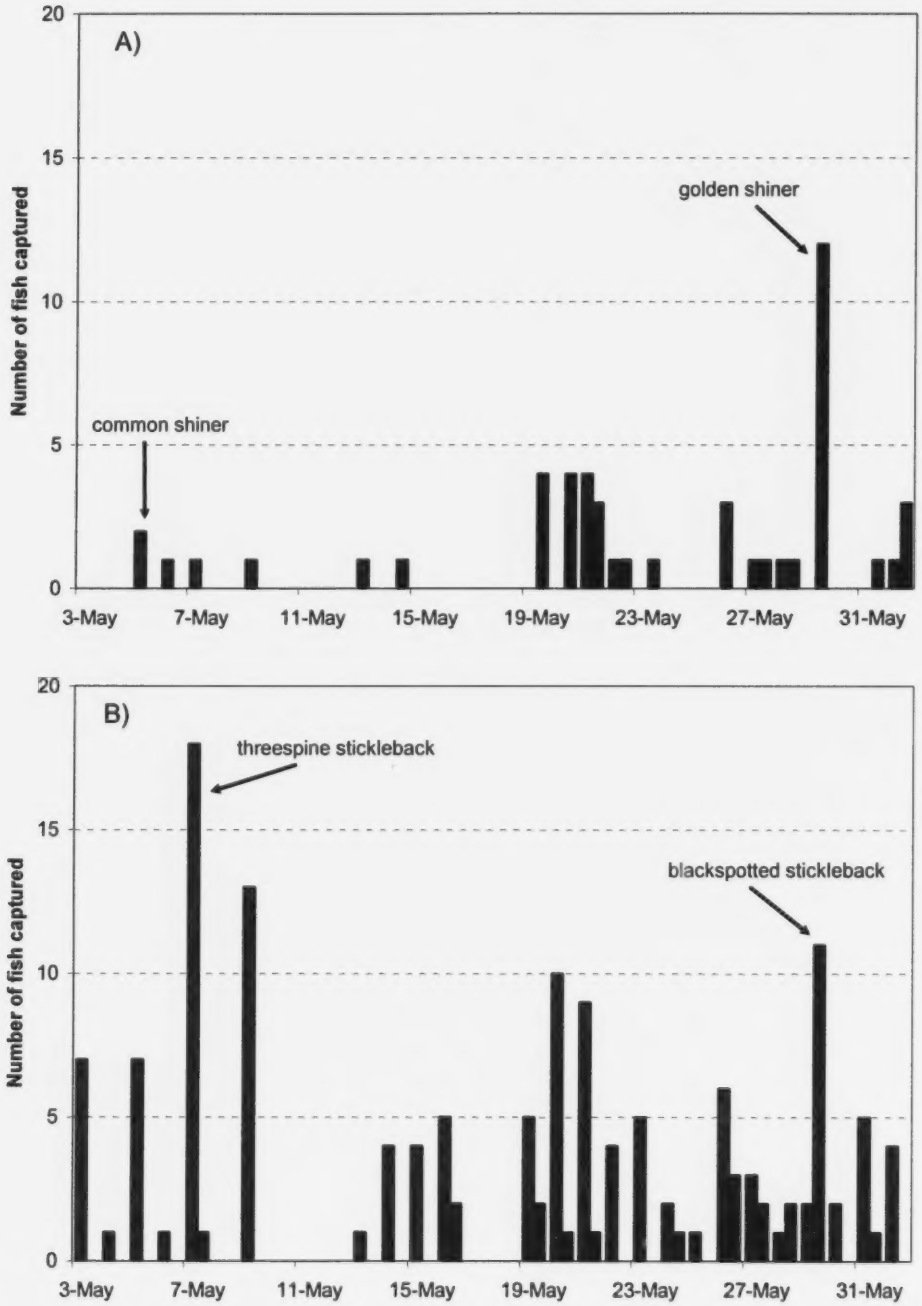

Figure 11. The daily catches of A) golden shiner (black bars) and common shiner (grey bars) and B) threespine stickleback (grey bars) and blackspotted stickleback (black bars) in the rotary screw trap in the River Philip during spring 2011.

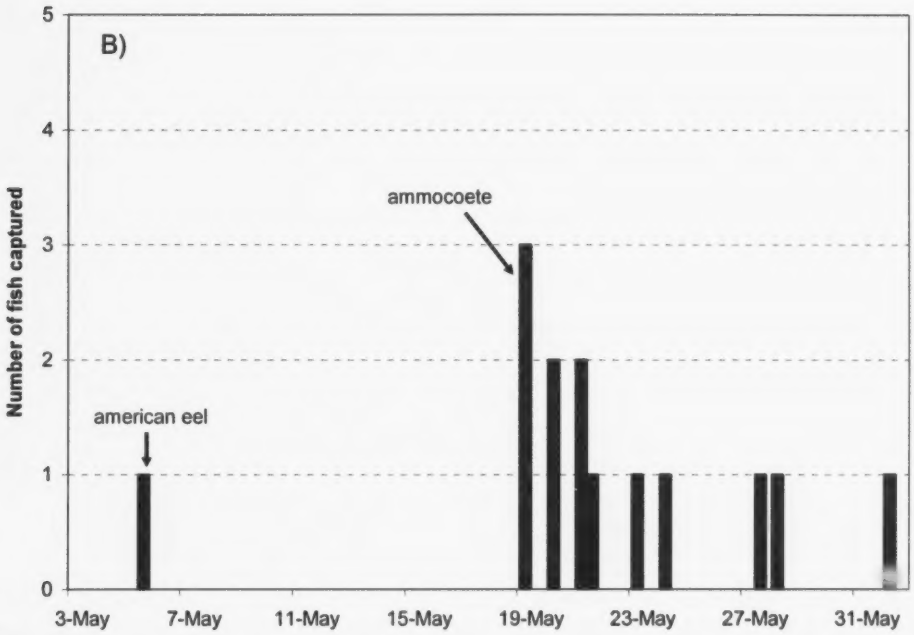

Figure 12. The daily catches of lamprey ammocoete (grey bars) and American eel (black bars) in the rotary screw trap in the River Philip during spring 2011.

Appendix 1

model{

```
# likelihoods
Ma~dbin(0.9,M)
R~dbin(q,Ma)
C~dbin(q,N)

# priors
q~dbeta(1,1)
N~dunif(0, 250000)
}

# data
list(M=396, R=8, C=523)

# Initial values for MCMC sampling – 3 chains
list(N=523, Ma=340, q=0.01)
list(N=2000, Ma=200, q=0.05)
list(N=20000, Ma=100, q=0.09)
```